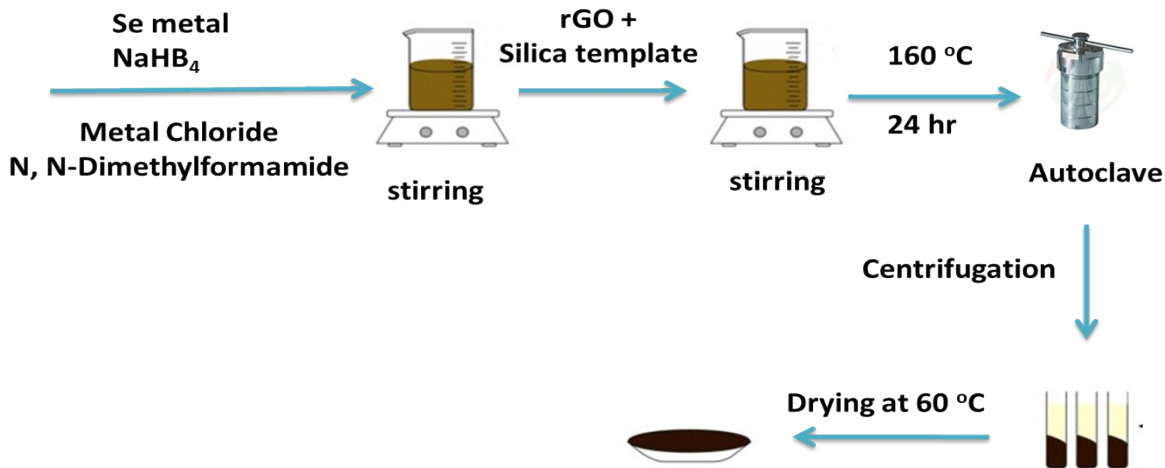


Scheme 1: Procedure of Graphene oxide preparation



Scheme 2: Procedure of Selenium-transition metal supported on rGO and ST Preparation

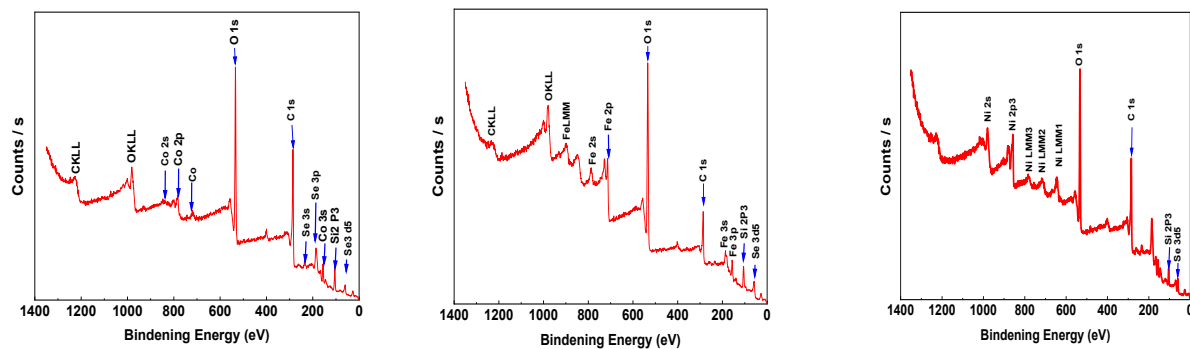


Fig. S1. High-resolution XPS spectra survey of (a) $\text{CoSeO}_3/\text{rGO-ST}$, (b) $\text{FeSe}_2/\text{rGO-ST}$, (c) $\text{NiSe}/\text{rGO-ST}$ electrocatalysts.

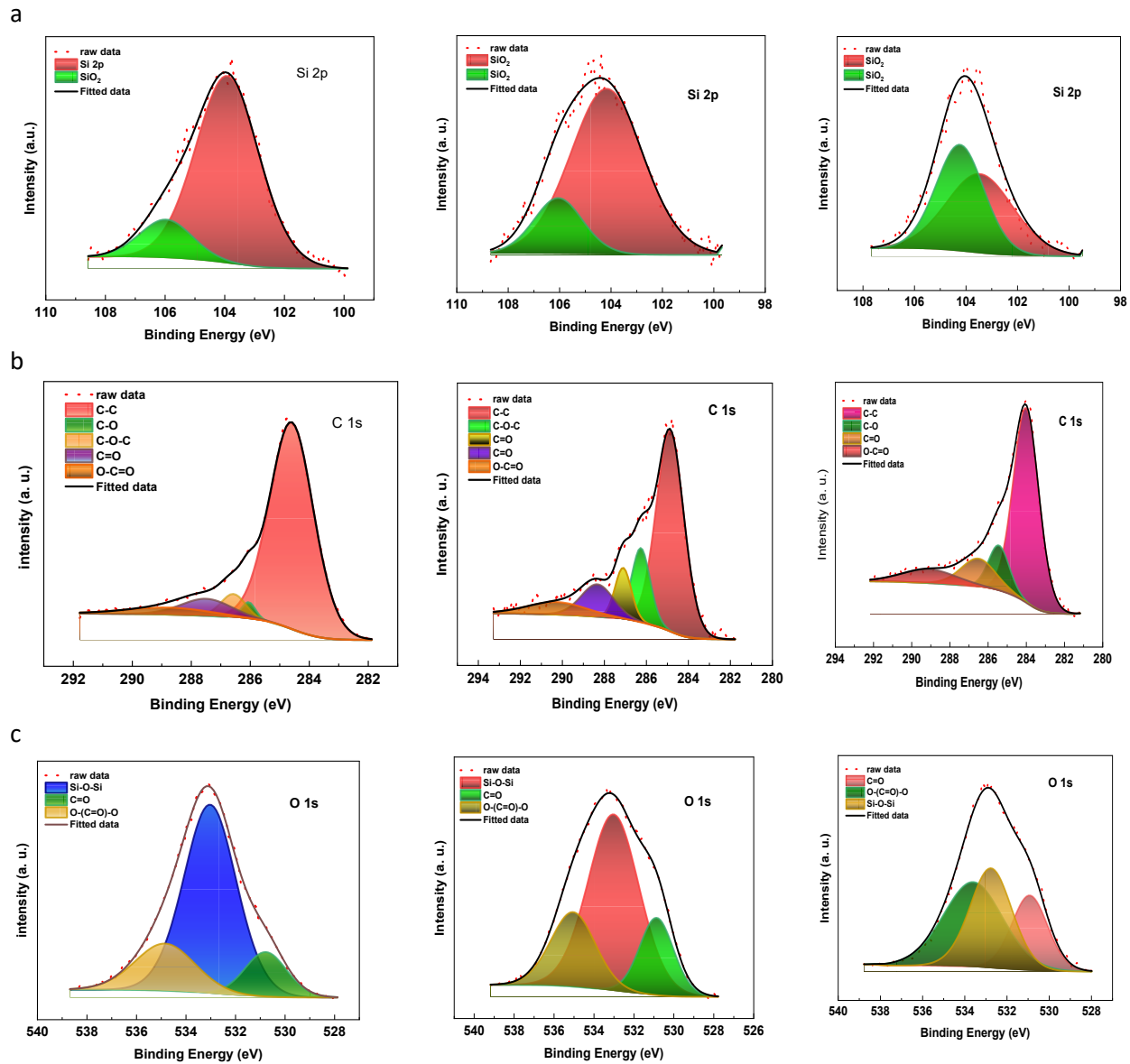


Fig. S2. High-resolution XPS spectra of (a) Si2p , (b) C 1s, (c) O 1s of of CoSeO₃/rGO-ST, FeSe₂/rGO-ST and NiSe/rGO-ST electrocatalysts.

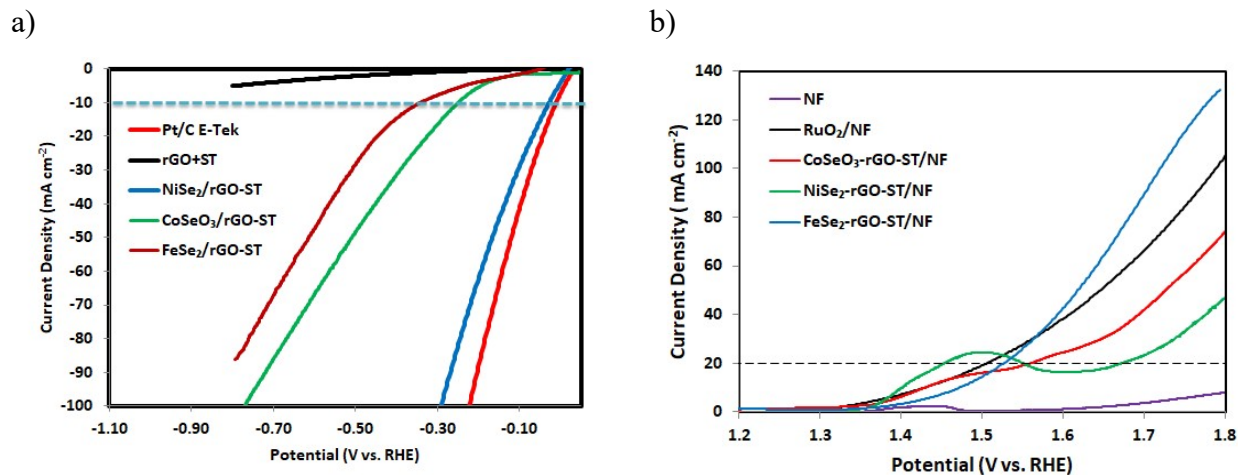


Fig.S3: LSV curve without IR correction of the electrocatalysts (a) HER curves, (b) OER

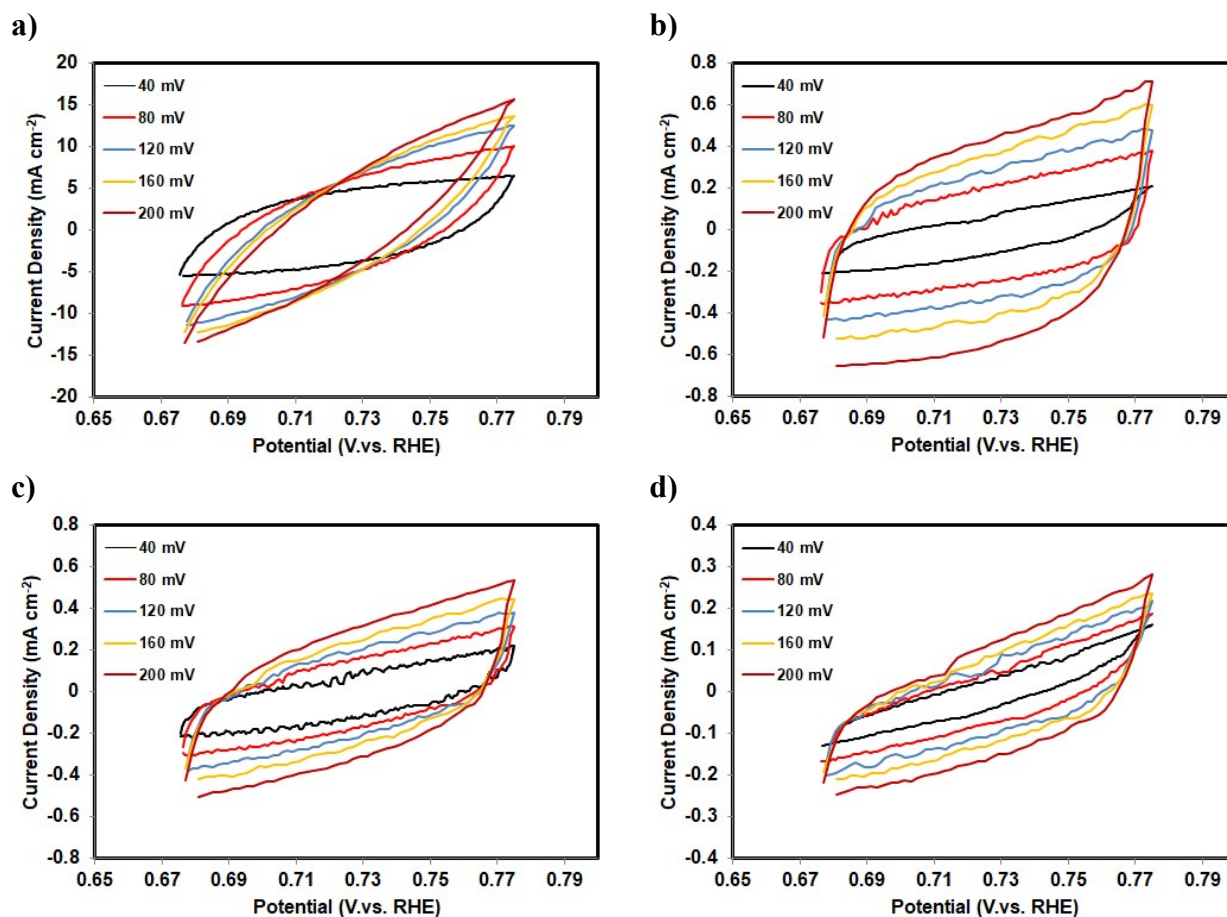


Fig. S4: Non-faradaic CV scans of Pt/C E-TEK a), NiSe₂/rGO-ST b), CoSeO₃/rGO-ST c) and FeSe₂/rGO-ST d) for HER at different scan rate

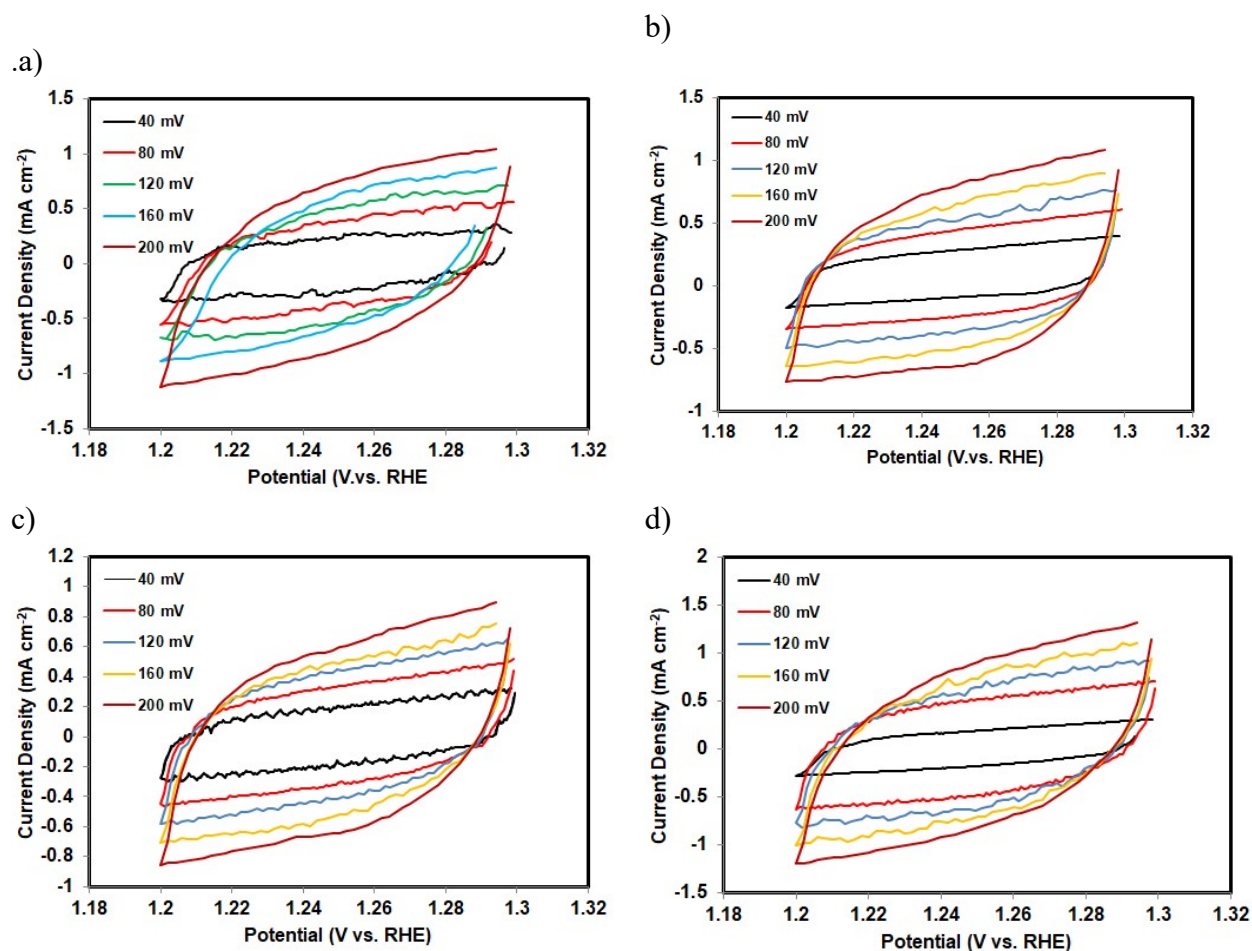


Fig. S5: Non-faradaic CV scans of RuOx a), NiSe₂/rGO-ST b), CoSeO₃/rGO-ST c) and FeSe₂/rGO-ST d) for OER at different scan rate

Table S1: The Rs, CPE, and Rct values for Pt/C E-TEK, NiSe₂/rGO-ST, CoSeO₃/rGO-ST and FeSe₂/rGO-ST

Electrocatalyst	Rs (Ω)	Rp	CPE	Rct	CPE
Pt/C	10.52	4.0811	0.00080503	27.296	0.056829
NiSe ₂ /rGO-ST	12.844			87.412	0.00092401
CoSeO ₃ /rGO-ST	7.5243	0.72285	0.00031961	40.079	0.051609
FeSe ₂ /rGO-ST	12.46			168.9	0.0011552